ORSAT Parametric Study

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ABSTRACT

A parametric study of the survivability of reentry space debris is presented. Since space debris can be of various size and shapes, a thorough parametric study can help to identify high risk items for reentry survival. In this analysis, a series of spheres and cylinders were analyzed using the Object Reentry Survivability Analysis Tool (ORSAT) to determine the degree of demise during reentry flight. ORSAT is a multi-discipline tool which can analyze spheres, cylinders, flat plates, and other objects with multiple materials. All of the pertinent object parameters such as diameter, wall thickness, density, initial temperature, and initial state vector information such as altitude, flight path angle, and velocity are input to appropriately define the solution space. The solutions are presented in graphical and table form. It is shown in this analysis that sphere and cylinder survivability is most dependent on the object size, specifically ballistic coefficient. It is seen that both a large and small sphere can survive, while a medium size sphere tends to demise in the atmosphere.